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THE LATE MR. SIDNEY SMITH, M.R.C.V.S.

THE news of the passing of our colleague, the late Mr. Sidney Smith, M.R.C.V.S., will have been received with very general regret throughout the veterinary profession, and beyond the limits of the profession, of which he was a zealous and a loyal member. Born at Halesworth, in Suffolk, so long ago as 1847, Sidney Smith qualified in London in 1869, and in the following year—that of the Franco-German War—he commenced practice at Lowestoft. Always keen on the better organization of his profession, he was one of the earliest members of the Eastern Counties Veterinary Medical Society, of which Association he subsequently was elected President. A frequent attendant at the meetings of the Society, his contributions to the discussions were characterized by sound practical common sense and a very catholic knowledge of veterinary science. Nor were his professional interests limited to his own local Association—he was also a member of the National Veterinary Medical Association for several years and showed his interest in its progress in various ways, including attendance at its Congresses at Yarmouth, Brighton, London, and elsewhere.

As we have indicated above, Sidney Smith's interests were not limited to the profession of which he was a distinguished member; he recognized the truth of the well-worn adage that "He who knows only his own side of the question knows very little of that." In accordance with these governing ideas of a long and useful life, he was not only an active member of his profession, but a loyal and public-spirited citizen.

On the formation of the Suffolk Hussars he joined that admirable corps, eventually retiring with the rank of sergeant-

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major. He took a keen interest, moreover, in agriculture, and early in life he purchased a farm at Pakefield, just outside Lowestoft, and carried it on successfully up to the date of his death. Mr. Smith followed local civic affairs keenly, and was Chairman of the Pakefield Parish Council, and also one of the School Managers. He acted as Veterinary Referee to various agricultural associations for many years, and was also an occasional exhibitor at the annual shows, besides holding official appointments under the Contagious Diseases of Animals Act from the Lowestoft Town Council and the East Suffolk County Council.

In private life Sidney Smith was a thoroughly popular and genial companion with a keen sense of humour, and an excellent sportsman. He married in 1885, and leaves a widow and three sons, the eldest of whom, Major Sidney Smith, R.F.A. (T), is now attached in the Royal Flying Corps. His second son is an estate agent in Australia, and his youngest son is also serving his country as a corporal in the Army Service Corps.

To the widow and family we address, on behalf of the profession, this expression of our condolences in their great loss.

ROYAL COLLEGE OF VETERINARY SURGEONS.

Special Examination.

At a meeting of the Board of Examiners held in London on March 23 for the Written, and on March 24 and 25 for the Oral and Practical Examination, the following gentlemen passed their Final Examination:—

Mr. J. Campbell, Mr. W. G. Clarke, Mr. S. Flood, Mr. L. Herbert (Royal Veterinary College of Ireland, Dublin); Mr. L. Anderson (Royal (Dick) Veterinary College, Edinburgh); Mr. G. B. Cooper (Veterinary College, Glasgow); Mr. J. W. Beaumont, Mr. L. D. D. Sewell, Mr. R. T. Smith, Mr. H. B. Williams (Royal Veterinary College, London).

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Editorial.

THE IGNORING OF THE VETERINARY PROFESSION.

Not once, but probably a dozen times in the last twenty years has the veterinary profession had the go-by given to it in domains in which it ought to have reigned supreme. We seem to remember Orders promulgated, prominent official positions given, Commissions appointed, laws drawn up in connection with veterinary matters ignoring the profession entirely or putting it under the thumb of men whose technical knowledge has been about equal to their inherent sense of modesty. Both have been remarkable by their absence, and the valuable results obtained for much misapplied effort expended have been consequently small or non-existent. Then it has been said what little progress the veterinary profession has made, how lethargic it is, and how many important scientific matters in connection with contagious and infectious diseases of animals remain in the elementary stage In some cases protests have been made at the small or wrong representation of our body on committees of inquiry, and sops have been given to weak Cerebuses by the powers that be. Perhaps no scientific body of men have been so frequently or persistently ignored as our own, but in this country in other matters there have been many instances of square pegs trying to fill round holes. No doubt this accounts for us being a long way behind other countries in matters of research and science. When important military supply affairs get into a muddle business men are asked for, when really what is wanted are scientific experts with organizing and administrative ability. D.D.'s are not the right men to conduct inquiries into pleuro-pneumonia, D.C.L.'s to investigate the uses of radium, nor M.D.'s to conduct research in swine fever, but under present happy-go-lucky-bag methods and provided they possess a sufficiently just sense of the unfitness of things, they stand a very good chance of arriving at the long job with the plentiful emolument.

How do these incongruous things arise? Is it not really because those with the most influence with the politicians get their own way? Those with the most wealth, or social influence behind them as a profession or trade union; those who hold the politicians' future in their hands by voting power; these are the

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ones that get the soft jobs. There is another class that sometimes succeeds in a measure in a subordinate yet lucrative position by means of sycophancy and lickspittleism, but these are not arts which any self-respecting independent body of men will care to practise. The whole position of our profession, judging from past and present Governmental methods, is likely we fear to remain obscure for some time. When our Bill becomes an Act things may improve under wise direction and application, but we always stand to have our dearest principles and traditions trampled on until we take up adequate measures for defence and advancement.

These thoughts have been summoned to mind by a contemplation of the list of members appointed by the Royal Society to conduct research into swine fever.

Whether the Royal College of Veterinary Surgeons can bring sufficient weight to bear to remedy or alter the list remains to be seen, but we think the true reasons for our passing by are hinted at or indicated in this editorial, and the procedure in the future will not be easy to remedy until we are strong enough politically to fight for our own hand. G. M.

SOME THOUGHTS ON LIGHT HORSE BREEDING.

An old Lancashire cotton spinner, whose son showed more inclination for totting up figures in the office than looking after technical matters in the mill, is reported to have said to him one day: "You'll need no books, John, if you don't look after the mill." The old man was shrewd, and had a just appreciation of the importance of a due sense of proportion between manufacturing operations and an estimation of their reward. We sometimes wonder whether a proper sense of the comparative relation between horse breeding and horse buying is ever considered by our authorities. It is certain that in the future "we shall need no cavalry if we do not look after horse breeding." In this matter of breeding animals and buying them a lack of a sense of proportion often seems to exist. It does not apply solely to horse matters. But there appears at times to be a sort of generally prevalent imagination that horses grow on trees, cows arise from buttercups and daisies, and pigs are regularly plentiful when spring showers come. At any rate, those who want horses,

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who need cows, and who solely feed pigs for pork and bacon are always more plentiful than those who produce them. The minds of the requirers never dwell on a consideration of how the subjects wanted are produced. Those who are determined and set on getting the animals are an infinitely greater crowd than those who work, trouble, and exercise their faculties in the breeding of them. If everybody wanted animals and nobody produced them stoppage would result. Fortunately, there are always some people ready to take the position of bottom dog. The worst of the matter is that if there is any spare kudos knocking about or any special material gain to be obtained, the pocket of the man or body that exercises the superficial qualities of the commercial traveller always benefits unduly. Instead of the major portion of the gain going into the hands of the breeders it passes into the purse of the middleman or the buyer. This is not as it should be in a country with which all is well.

Any special encouragement given should be exercised in favour of the producer rather than towards the distributor and buyer. When the last are in infinitely greater force than the first, the need of fostering and furthering the interests of the producers becomes far more necessary and important. It is only by so doing that the goodwill of the breeders will be obtained and kept.

We look forward to a time when the breeders of all animals will be far more numerous than they are to-day, because they will always be assured that as a result of their labours they will receive due and adequate reward. To bring this about breeding must receive generous support by the State, as represented at present by the Development Commissioners.

For military transport on good roads perhaps horses will be largely superseded by motors, but even so, countries without good roads are more likely to be the scenes of future warfare than not. Whether roads be good or bad, cavalry and artillery horses will always be needed. For many years the price of a four-year-old remount has ranged from £40 to £45 in this country, and if it were not for the great demand at present we should probably find the figure still merrily sticking there or thereabouts. What prices have recently been given for cavalry horses by other countries? The Dutch Government have taken the pick of many Irish horses *when three years old* at £40 to £45; the American

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Government, with all its advantages for the cheap production and rearing of light horses and with the breeding industry well supported by the State, gives about £36 on an average for three-ear-old remounts in its own country, and mules are valued at a igher rate than this. Sir Alfred Pease leads one to infer that bout £40 *for a three-year-old* light horse gives the breeder a fair profit here if it has been produced from a mare capable of work on a farm and suitable for breeding half-bred stock. If the foal is the product of an idle mare, he estimates that if the owner sells his first four-year-old at £90 there will only be £12 profit for him after what may be described as five years of successful breeding. Has anybody ever heard of £90 being given regularly or at all for remounts? He seems to express a doubt whether there are mares capable of full agricultural employment on a farm and suitable for breeding half-bred stock, and with his hesitation we are inclined to concur, although in one country the plan is carried out, for in Germany most of the mares outside the Government studs used to breed Army horses are put to farm work. Major Honner considers that it costs £60 to produce a sound four-year-old Army horse (presumably he means a cavalry horse). All these facts go to show that the price hitherto given for Army horses in times of peace has been much too low to ever foster and encourage the production of a large or sufficient supply.

As regards the methods adopted for increasing the production of cavalry horses, these may consist of State studs run entirely by the Government and encouragement of horse owners to breed suitable horses for the Army by registration of stallions and allocation of premium money to the owners of both mares and stallions. The one plan does not necessarily mean a closure of the other; in fact, the best results will probably accrue from a combination of the two schemes. In any case the science of breeding and the best means for its advancement will be furthered and perfected by the establishment of State studs.

In Germany most of the stallions are State owned, and at the Government studs the mares, too, belong to the State, but a great many mares used for breeding to the registered stallions are in the hands of private owners. Stallions are passed for a year only, and have to be approved of again the next. The State determines what kinds of mare and foal are eligible for premiums, and also contributes a great part of the prize money. In America,

Dr. D. M. Campbell tells us that "one third of the States, including about two-thirds of the horses in the country, have very materially aided horse breeding in the last half dozen years by stallion registration laws. No horse or jack can be used for service until he has passed an examination by a veterinarian and is shown to be free from hereditary unsoundness. A notice showing his breeding must be prominently displayed, and only pure-bred stallions with pedigrees acceptable to the State authorities can be advertised as 'pure-bred,' 'full-blooded,' 'pedigreed,' &c. The United States Department of Agriculture spends $60,000 a year on horse breeding in Colorado and Virginia, and the two States concerned spend an equal amount." In our own country grants for light horse breeding amounting to £36,500 and £31,500 were made by the Development Commissioners to the Board of Agriculture and Fisheries for 1913-14 and 1914-15 respectively. The grants are declining in value, and this is a matter for regret.

As regards the districts in which Government stallions operate, these should be carefully picked in order that the State may not compete with privately owned and rightly registered stallions, whose owners submit them regularly for examination. Mares, too, should be periodically inspected and overhauled. Handy and plentiful markets should be indicated and established and periodical sales take place. The conditions of soil and climate need consideration as regards the type of horse intended to be produced.

A great many of the errors in connection with the estimation of an adequate price for the breeder to receive for his produce might be corrected if careful statistics as to the results of mating could be largely collected and tabulated. This is one point in favour of exclusively owned State studs. The matter of the science of zootechny has been almost wholly ignored in this country. We have read one French book on zootechny and one from the land of Ishmael, and probably there is one in America, but we have never come across a reliable text-book on the subject that has been produced in the British Isles.

The value of carefully prepared records as to the number of stallions operating in any given district, of mares covered, of live foals produced, of management of stallions and pregnant mares, and any scientific investigation and settlement of questions

affecting fertility cannot be over-estimated. There are a good many hazy points connected with breeding as yet not elucidated. From an economic and scientific standpoint it would be wise to have some of them cleared up, but this can only be done by having opportunity, such as State studs would afford, for thorough research and investigation. In America (where some estimate that 1,000,000 light horses may leave the land for this war), no less than in the countries of the Allies, far-seeing breeders and buyers are wondering what can be done to cope with the contemplated future horse famine. The answer to what must be done if the famine is to be stayed is a plain and straightforward one. G. M.

General Articles.

RESPIRATORY ANÆSTHESIA OF ANIMALS.*

By Dr. L. A. MERILLAT.

Professor of Surgery in the McKillip Veterinary College, Chicago, Illinois.

I have decided to limit my remarks to the above title because the distinguished reporters, Professor Hendricks, Professor Vennerholm, and Professor G. H. Wooldridge, will undoubtedly present the complete formal discourse on the general subject, and, besides, my experiences with intravenous, hypodermic, intraperitoneal, and rectal anæsthesia has been so disappointing from every standpoint that I lack the inspiration to write about them. On the other hand, my experience in anæsthetizing about ten thousand horses and many small animals by inhalations inspires me to report the confidence that can be placed in the old, standard, conventional method.

Naturally we Americans are proud of our achievements in this connection. We seldom fail to point with pride to that historical event in the Massachusetts General Hospital in November, 1846, where the first major operation under inhalation anæsthesia was performed. Dr. W. T. G. Morton, under whose supervision the anæsthesia was administered for this eventful operation, is a much revered man with us, and while we are not unmindful of what followed in Europe to bring his discovery into greater prominence than was possible in America at that time, we are more and more

* Paper presented at the Tenth International Veterinary Congress.

inclined, as surgery progresses, to claim for Morton a place among the great benefactors of the human race and of the animal kingdom. At least, an American speaking abroad would be accused of a sin of omission if he failed to pay tribute to Morton's memory while dealing with the subject of respiratory anæsthesia.

Veterinarians in America—and, I believe, the world over—have been very slow to avail themselves of this most effectual and most certain method of controlling surgical pain. Substitutes for this complete general anæsthesia, which only stupefy surgical patients, and local anæsthetics have always attracted more attention in the veterinary profession. Our current literature is often full of new methods of anæsthesia, but it is signally lacking in instructions on the administration and proper management of inhaled anæsthetics. We seem to be acting toward respiratory anæsthesia as if it were an exact science of which everyone is master; as if we had exhausted all of its possibilities, and, finding it faulty, we must now seek for other methods; and as if it were attended with obstacles or dangers which make it inapplicable to our work. In short, respiratory anæsthesia is still little used, and is still too little understood in the veterinary profession. It has never been extensively practised.

Anæsthesia extending to the point of complete relaxation of the musculature, in the hands of the untrained, is an exceedingly hazardous state. If prolonged for an hour or two the hazard increases. On this account a veterinarian about to perform an operation of some duration, the technique of which will require his full attention, is always inclined to avoid this method of controlling pain. In fact, it does offer disadvantages he cannot easily overcome. Trained anæsthetists are not numerous, certainly not within the reach of all veterinarians, and where one can be procured, the added cost to the already ill-paid surgeon prevents his employment. When the anæsthesia is entrusted to untrained hands, the mental strain of dividing the attention between the safety of the unconscious patient and the operation itself invites disaster from both sources.

But in spite of this dark side of the question there is such a bright side that it seems a pity we practise it so seldom. Safe respiratory anæsthesia depends solely upon keeping well under the lethal dose for a given patient. That is, *we must not poison our patients*. To produce maximum anæsthesia with a minimum

of drug is the desideratum, and it is only by accurate dosage in its highest possible refinement that this can be accomplished. In this we are confronted with the task of delivering an elusive vapour to our patients in a given quantity. That this is a problem difficult of solution I admit, but being an exceedingly important matter as well as the real solution of safe anæsthesia, it behoves us to work to this end as the expert anæsthetists of human beings are doing. Automatic mechanical measurement of vaporized chloroform or ether and the effectual delivery of a given amount to a patient will make anæsthesia an exact science. Anæsthetists of humans have the matter well in hand by utilizing complicated apparatuses adaptable for their use. Similar apparatuses applicable to animals are needed to bring our respiratory anæsthesia nearer to perfection.

When an operation is short and the patient vigorous the limit of safety need never be approached, but when the operation is a long-drawn-out affair and the patient sick and weak, the limit of safety is easily exceeded. From the beginning it has been the custom of anæsthetists to gauge the dosage by the reaction of the patient. Little attention was paid to the amount consumed. To-day the amount consumed is being pre-eminently considered, and splendid methods of regulating this amount are being worked out. The uncertainty of depending entirely upon the reaction of the patient needs no comment. Such observations are sometimes misleading. They permit of no fine explanations for the instruction of others, and thus prevent the standardization of methods through which uniform results can be achieved.

That respiratory anæsthesia may be safely entrusted to the student, the inexperienced assistant, or fellow-practitioner is wrong. The successful administration of an inhaled anæsthetic requires a wealth of experience. Of this I am convinced. Respiratory anæsthesia is safe enough when neither profound nor prolonged, and especially when administered to a sound, vigorous subject properly prepared for the ordeal. It is particularly safe when the operation is of such a character as to wield but little influence on the course of the anæsthesia. On the other hand, patients sick with disease of an enfeebling character, requiring an exhausting operation of long duration (one hour or more), very readily fall victims to badly administered anæsthetics. It is in these cases that the skill of an experienced anæsthetist is needed

to carry the patient safely through the operation and to prevent post-anæsthesia complications. Exceptionally sanguinary operations are also dangerous when the anæsthetic is badly administered. When the blood loss reaches the danger point prolonged and profound anæsthesia is exceedingly dangerous. A surgical patient weak from blood loss and saturated with chloroform or ether is always a real hazard.

I therefore divide all patients requiring general anæsthesia into three groups as follows:—

First Group.—In this group I include all patients which can be safely anæsthetized without any especial skill on the part of the anæsthetist. The operations are of short duration, and the patients are vigorous. Their afflictions have not affected the general health to any appreciable extent, and the operation will not exert much influence upon the anæsthesia. I refer here to neurotomy, tendonotomy, ablation of small growths, castrations, hoof operations, and other minor operations too numerous to mention. For such operations respiratory anæsthesia is always better than local or regional, and sometimes it is absolutely necessary to obtain the best results. Accurate work is often impossible under local anæsthesia, because these do not control the struggles against restraint. Intractable horses, vicious horses, and nervous dogs are never well controlled with local anæsthesia, and so often local anæsthesia is not complete. For example, in the operation of dividing the tendon in volar flexion the slightest jerk of the leg at a crucial part of the work prevents accuracy, and such disturbing movements are never effectually controlled by any form of anæsthesia except that produced by inhalations of chloroform or ether.

All the operations of this group are of relatively short duration, complete or prolonged relaxation of the musculature is not essential, and the patients are in good health and well prepared. The danger is therefore negligible even when the administration is left to more or less inexperienced hands. The state of unconsciousness required for these operations is but a transient hypnosis—an anæsthetic veneer—that is seldom dangerous. The painless steps of the operation, such as washing the field, shaving, paring of hoof, &c., are all done before the anæsthetic is administered; then, as soon as the painful part is completed, the patient may already be reviving while the bandages are being

applied. In this manner the time of total unconsciousness is very short.

In this group of patients I bring about a state of surgical anæsthesia in a few minutes by forcing the delivery. Sixty to ninety cubic centimetres of chloroform (for horses) is placed in the sponge, which is large enough to hold it all without dripping, the muzzle is anointed with vaseline, and the sponge is held to the nostrils in an air-tight sheet of oilcloth large enough to fold over the head when gathered up. The anæsthetist bears upon the poll, and holds the sheet in place by encircling the arms around the nose. By thus holding the nose from the floor or table the head can be well controlled against the struggles which ensue as the administration begins. In from *one to two minutes*, when the struggling ceases and the respirations become soft and more shallow, the sheet is spread out and the administration continued by dropping the chloroform through a towel stretched over the uppermost nostril. The undermost nostril is free from obstruction. In the short minor operation no especial attempt need be made to bring about a very profound state of anæsthesia, as the work is often done before all the reflexes have been banished. When, however, the operation is of longer duration or a relaxation of the musculature is desired, it is safe enough to force the administration to a successful issue by closing the undermost nostril as the chloroform is dropped into the towel on the uppermost one. This is continued until the *corneal reflexes* wane or disappear. It is not safe for the novice to push matters too far at this point. It is better for the inexperienced to err in the direction of too little anæsthesia than to venture too near the danger point. Almost all of the operations of this group can be effectually completed without entirely dispatching the corneal reflexes. The state of the *respirations* must then be kept under strict surveillance. If regular everything is well, but when a pumping or jerky state develops, the free admission of air without any chloroform must be insisted upon until the unnatural breathing corrects itself. The shallow inspiration that ends in a sudden collapse of the abdomen is a bad sign, and even the deep inspiration that ends thus must be regarded with a suspicion that the danger-point is being approached. I always hesitate to say too much about the corneal reflexes as safeguards against danger because too much dependence cannot be placed upon them.

Better to note carefully the story being told by the respirations, and secondly, the pulse, than to depend so much upon the cornea. The cornea gives a fair idea of the state of anæsthesia, but it is never a safeguard against asphyxia or syncope. *Guttural sound* is a cue for the anæsthetist to draw the tongue forward to prevent it from crowding the pharynx. The pulse in this transient and incomplete anæsthesia may be very slow and soft without presaging danger, but when the artery becomes empty and the pulse waves become distinctly separated one from another, the danger-point from embarrassment of the heart is near.

To keep within the bounds of safety, the anæsthetist who is inexperienced must be instructed to withhold the anæsthetic, extend the head, draw the tongue forward, and leave the nostrils free from obstruction on the very first appearance of any unnatural behaviour of the respirations or pulse, even at the risk of annoying the operator; and should the respirations cease entirely artificial respiration must be induced instantly. No time must be lost by giving medicaments, as artificial respiration is most important. The best method of restoring the respiratory function is to press the foot into the abdomen firmly and deeply, but not harshly, at first three times per second, and then oftener if these fail. Care must be taken not to obstruct a spontaneous inspiration that might be taken while these exercises are being done. Simultaneously with these manœuvres, others are engaged in extending the head, withdrawing the tongue, releasing the restraining ropes, harnesses, belts, &c., and, as soon as possible, the patient should be rolled to the opposite side to prevent blood stasis. A medicinal dose of strychnia may be given hypodermically. Inhalations of ammonia I have found to be harmful. When these means fail in the horse little else can be done—the patient is dead. In the dog swinging the body to and fro from the hind legs, rubbing and slapping the body is sometimes effectual after artificial expansion of the thorax has failed. Artificially induced respirations come first in resuscitating patients overwhelmed with an inhaled anæsthetic, the others are subordinate. As long as the heart still beats, no matter how feebly, there is still hope of exciting the respirations into activity, but when the heart ceases to beat, I fear we have but little chance to revive our over-anæsthetized patients. It is, however, only rare that the heart is the original mischief-maker, and when it is, the patient is at once beyond hope of resuscitation.

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When one of these short operations has been completed the restraint apparatus is removed and the patient is allowed to lie stretched out until it will react to the loud clack of a strap across its rump. It can then stagger to its feet with a little assistance, and, after a few uncertain steps, soon regains its equilibrium. Depending upon the duration and depth of the anæsthesia, this is from fifteen to forty minutes after the last bit of anæsthetic was given.

Thus far I have endeavoured to show the kind of subjects that can be anæsthetized with safety, and the general plan of administration used in our clinics. With few variations in the apparatus used this is a fair description of the prevailing American customs. In conclusion, I desire to repeat that it requires no especial skill or knowledge not possessed by any veterinarian successfully to handle respiratory anæsthesia in healthy animals when the operation is of short duration. We find that veterinarians who adopt respiratory anæsthesia in the general plan of these minor operations soon use it to the exclusion of all other methods, and, besides, they soon become more proficient surgeons as well as expert anæsthetists.

Second Group.—The second group of patients presents the surgeon with an entirely different problem. In this group we include animals more or less enfeebled by the disease for which the operation is to be performed, and all those afflicted with diseases requiring long-drawn-out sanguinary operations. Among these are poll-evils, fistulæ of the withers, septic podotrochlitis, carcinoma of the eye, mammæ or penis, actinomycomata, scirrhous cords, large tumours, wounds with visceral complications, thecal abscess of the fetlocks, and others too numerous to mention. In these cases we miss the aid of the expert anæsthetist. The broadest knowledge of anæsthetic drugs and their remotest behaviour in the organism, coupled with skilful handling that can only be learned by wide experience, is absolutely essential to bring these subjects safely through these operations and the post-operative convalescence. It is in these operations that respiratory anæsthesia has proved such a hazard to veterinarians who have practised it without trained help. In these long operations it is inconvenient unless an anæsthetist in whom the surgeon has implicit confidence is employed. In fact, it is so hazardous and inconvenient that veterinarians seek refuge in all

sorts of substitutes that only stupefy their patients. But these substitutes are not anæsthetics, they are only subterfuges. They do not answer the purpose of a real anæsthetic from any standpoint, and the only reason they are used is found in the fact that respiratory anæsthesia has been found dangerous in the very class of operations in which it is most needed.

Our death-rate from anæsthesia, and during anæsthesia, in the first group of patients has been low, but in this the second group it has varied in strict obedience to the skill displayed in the administration. In our clinics, where a more or less skilled anæsthetist is always available, the mortality is not high—in fact, it is very satisfactory; but when it becomes necessary to operate in the rural districts, where there is no trained help, the death-rate is appalling. An anæsthetist at the Mercy Hospital, Chicago, U.S.A., has anæsthetized 45,000 patients without a single death during anæsthesia, and, while such a record is worthless until it includes the post-operative history of the same patients, it shows that veterinarians are far behind surgeons of human beings in the handling of respiratory anæsthesia. In animals there are no statistics at hand from which the danger or safety of anæsthetics can be determined. I am, therefore, compelled to report only my own observations, and from these I have learned the lesson I am endeavouring to report—that is the danger of leaving the administration of respiratory anæsthetics for long, serious operations to untrained hands, and the relative safety of leaving it to the very same hands for short, simple operations. In short, the relief from this unfortunate situation which prevents us from resorting to inhalation anæsthesia where it is most needed will be found in the expert anæsthetist. I have always encouraged my students to practise respiratory anæsthesia, soundly condemning all other kinds of general anæsthesia, in order that we might develop more experts among us.

I shall now describe two methods of administering respiratory anæsthetics for serious operations that have proved the safest at my hands.

First Method.—An animal about to be submitted to a serious operation is conditioned into as healthy a state as possible by grooming, cleaning, feeding, exercising, &c. The volume of the intestinal contents is reduced by careful feeding, and food is withheld just before the patient goes to the operating table. The stomach should be empty.

As chloroform, although the most effectual drug for all animals, is entirely too toxic to be administered alone through a long operation, we resort to (1) a *preliminary anæsthetic*, (2) the *anæsthetic proper*, and (3) a *terminal anæsthetic*.

As a *preliminary anæsthetic* we administer chloral hydrate *per os*. Thirty to forty grammes dissolved in a litre of hot water is given as a drench one hour before the operation. Chloral given *per os* on an empty stomach gives a fairly uniform action. It is always safe, and may be depended upon to do all that is required of a preliminary anæsthetic.

As the *anæsthetic proper*, we administer chloroform with a sponge and a canvas cylinder. The canvas cylinder is 1 ft. in diameter and 18 in. long, closed at each end with a tobacco-pouch string. One end is drawn over the nose, drawn tightly and fastened to the halter to prevent slipping off. Through the other end the sponge containing 30 c.c. of chloroform is placed against the nostrils. If a state of anæsthesia is not promptly produced another 30 c.c. is added to the sponge. The free end of the cylinder is held shut with the tobacco-pouch string or with the hands. As soon as the reflexes are well under control the cylinder is folded back so as to expose the nostrils, and the work of maintaining a satisfactory state of anæsthesia is begun by administering the terminal anæsthetic composed of equal parts of alcohol, chloroform, and ether. This is administered through a towel laid over the nostril. The part immediately over the nostril is kept well soaked with the mixture. Air is allowed to pass freely through the undermost nostril. If the patient is obstinate we advise against the second use of the bag, but recommend that the undermost nostril be closed and results patiently awaited from the administration of the mixture through the towel. When an exceptionally profound state of anæsthesia is desired, as, for example, when a deep state of relaxation of the musculature is essential, pure chloroform may from time to time be dropped into the towel instead of the mixture. In this manner we seldom poison a patient by erratic delivery, and while the state of anæsthesia is not as profound as some would desire, it is usually sufficient to enable one to perform almost any veterinary operation. Shock from slight anæsthesia is not common, but when it is possible to block the reflexes by cocainization of a nerve-trunk I advise that this be done. It was Crile (Cleveland,

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Ohio) who demonstrated that the brain is continually being bombarded with impressions from the seat of the operation in spite of even very profound anæsthesia. If this explains the cause of shock after prolonged operations we, too, should resort to nerve-trunk cocainization whenever the seat of operation is conveniently located. In small animals we use this same general plan, but administer chloroform with much greater care as regards regular and decisive delivery, as these animals are more susceptible to over-dosing than the large herbivora. For dogs especial apparatuses are handy but not essential. Ether is more fool-proof in small animals than chloroform, and should be chosen by inexperienced anæsthetists.

Second Method.—The second method of administering respiratory anæsthetics for serious operations is one I shall recommend with great caution, because it has only recently been introduced into our clinics. It is the *endotracheal delivery* which differentiates it from our old plan. The other features are analogous. We administer the preliminary anæsthetic of chloral, and then deliver the anæsthetic proper and the terminal anæsthetic into the trachea with an atomizer. The rubber tube entering the atomizer is attached to a foot-bellows, the bottles containing the anæsthetics are placed into a small wooden box containing also an electric incandescent light to raise the temperature of the liquid, and the delivery tube is placed into the trachea through the uppermost nostril.

The foot-bellows agitates the warmed liquid and delivers it vaporized directly into the air passages. We deliver pure chloroform until anæsthesia is produced, then shift the delivery tube to a bottle containing the terminal anæsthetic of alcohol, chloroform and ether, also contained in the wooden box. We have used this crude apparatus with such splendid success that it seems worthy of improvement. Patients fall rapidly and safely into a surgical anæsthesia, and the exact amount of vapour delivered can be determined. There is none lost in the surrounding atmosphere.

The delivery tube can be very easily placed into the trachea in large animals. In small animals the opposition makes the method less inviting; and, as in human beings, it is necessary first to bring about anæsthesia with a face-mask, and then prise the mouth open and deposit the tube. This hindrance leaves it hard to recommend for dogs and cats.

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FATALITIES AND OTHER UNTOWARD SEQUELÆ.

Serious results from prolonged anæsthesia are due chiefly to over-saturation—the patient is poisoned. If overdosed patients survive the operating period, they may even die afterwards or produce havoc by falling into a more or less serious state of delirium. *Chloroform* delirium supervenes on long sanguinary operations. The unfortunate subject perspires copiously, rolls its eyes, fights with all-fours, and makes futile attempts to rise. If it finally regains the standing posture it lunges forward, presses the head to the wall, and falls about entirely oblivious to its surroundings. These manœuvres are, of course, disastrous to the seat of operation. Ligatures slip off, sutures are torn, and in fact general havoc to the wound results. This unfortunate sequel is often the unhappy end of an otherwise splendid operation where accurate dosage is ignored. It occurs in different degrees of severity in strict obedience to the amount of chloroform consumed. Some end fatally, some die from wound complications, while others recover after a few hours, little injured by the ordeal through which they have passed.

Pneumonia, I have found, seldom follows chloroformization without some other influence. Embolism and the enfeeblement following the operation are more to be incriminated than the chloroform. When influenza is prevalent there is more danger, but I have never seen it follow chloroform anæsthesia where these added influences do not exist.

Heart-failure is a rare accident where ordinary care is exercised to avoid susceptible subjects. With me it has occurred chiefly in animals affected with heaves, laryngeal hemiplegia, obesity, and senility. An aged fat horse leading an idle life must be anæsthetized guardedly. Reflex syncope in which the amount consumed plays no part has occurred twice in my experience. These two animals (horses) died suddenly at the very beginning of the administration. Both of these animals were fat and lacked vigour.

Asphyxia is the usual form of death during anæsthesia. Due either to erratic dosing or to over-dosing, the prevention is found in keeping the amount consumed as low as possible, delivering the vapour regularly, and in watching incessantly for unnatural respiratory movements.

I have experimented somewhat with the *intravenous delivery*

of both ether and chloroform, but have thus far been unable to bring about a satisfactory state of anæsthesia without endangering the patient's life from over-dosing. It is, however, evident that there is still some justification in experimenting further with this method. We need an apparatus that will deliver a regular flow and that will keep the anæsthetic at a uniform temperature. With this provided for we may yet decide upon this method of administering anæsthetics to animals to the exclusion of all others.

Summary and Conclusions.

(1) For slight anæsthesia suitable for short operations the respiratory delivery is safe even in the hands of untrained anæsthetists.

(2) For the profound anæsthesia required for serious and long operations, respiratory anæsthesia is safe only in the hands of experts.

(3) The most discouraging part of respiratory anæsthesia for animals is the difficulty of regulating the dosage. We need an apparatus to automatically measure the vapour delivered and consumed by the patient.

(4) For profound anæsthesia of considerable duration, the best way to keep within the limits of safety is by administering a preliminary anæsthetic of chloral, followed by chloroform, and then maintain the narcosis with a terminal anæsthetic of alcohol, chloroform, and ether.

(5) Despite profound anæsthesia exhaustion of the brain follows serious operations. This may be prevented by blocking with cocaine the nerve-trunks which lead from the seat of operation.

(6) The endotracheal delivery of respiratory anæsthetics is worthy of a trial. It is a step in the direction of dose regulation suitable for animals.

(7) Intravenous delivery of ether and chloroform is unsafe with the apparatus we now have for their administration.

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DISTOMATOSIS, OR LIVER FLUKE, IN CATTLE AND SHEEP.

By ROWLAND WILLIAMS, M.R.C.V.S.

Fasciola hepatica, the common liver-fluke, is a leaf-shaped parasite. It is slate-coloured, and has in this country a crinkled edge. It is about 1 in. in length, and from ¼ to ½ in. broad. The parasite is found in the liver of cattle and sheep, sometimes in such large numbers that it occludes the bile-ducts and causes death to the host.

On *post-mortem* of an infected animal it depends to what extent the host is affected, and the length of time it has been affected, as to whether fat and good condition are present, or emaciation. Animals newly or only slightly affected seem to thrive well, and, on the contrary, animals affected for a long time or heavily infested with parasites are emaciated. The liver will be observed to be enlarged, also the gall-bladder, and the bile-ducts will stand out and be much whiter than normal. On section the bile-ducts will be thick and fibrous.

The loss in this country last dry season was large enough to be important. Cattle affected last rainy season would probably not stand the drought like healthy cattle, and a large percentage have died of so-called poverty. On one ranch in Mashonaland the loss was very heavy; about 70 head of cattle died out of 1,000, and upon investigation the animals were found to be heavily infested with these parasites.

At present there is no known treatment for this disease. Many remedies have been tried without satisfactory results, and it will be understood how difficult it is to reach with a drug a parasite so well protected by the thickened bile-ducts in the liver.

To owners of farms free from this pest, a rough life-history of this parasite will be helpful in taking preventive measures.

The adult hermaphrodite inhabits the bile-ducts of cattle and sheep, and at certain periods, in accordance with the food the host consumes, lays eggs which pass out of the host with the fæces. Should these eggs be dropped on wet stagnant land, or on the edge of water holes, out of the egg is hatched a small swimming form of the fluke which finds for itself a host in a snail, in which it occupies part of the air chamber or lung; there another metamorphosis takes places, giving rise to still other forms of the

parasite in large numbers. These forms break free from the now dead snail, attach themselves to blades of green grass, and there encyst and wait until some ox or sheep eats them, and so the cycle goes on.

I would suggest the draining of stagnant land as a means of prevention. The keeping of ducks and geese would, I think, help to keep down the snails. Salt is recognized as a good dressing for land affected with fluke.—*Rhodesia Agricultural Journal.*

A DEFENCE OF GOVERNMENT HORSE BREEDING.

By J. N. HORNBAKER, D.V.M.

Referring to the article in your issue of December 3 by General John B. Castleman concerning "Government Horse Breeding," I was sorry to learn that the different breeding projects which the Bureau of Animal Industry is conducting have been confounded with the breeding of horses for Army remounts. I also wish to take exception to some of General Castleman's statements relative to the cost of raising colts by the farmer, and the inducements offered them to co-operate in this work.

The Bureau of Animal Industry's Service Announcement for April 15, 1913, states that in placing remount stallions "local wishes will be respected and the breed of stallion placed in a community will be that which is most generally preferred by that community. . . . Furthermore, every effort is to be made to avoid competing with privately owned stallions, and horses will not be placed in communities which are already well supplied."

Parties breeding mares to Government stallions give the Government an option on the resulting foal at $150 during the year it is three years of age. The breeder is not held to this option, for if he wishes to be relieved he may pay the service fee of $25 at any time before the colt is taken up by the Government. If the foal dies no service fee is charged. If the colt is offered to the Government and purchase refused no service fee is charged. If the colt is purchased by the Government at $150 no fee is charged, making the price equivalent to $175.

Further, suppose, for instance, a farmer breeds five mares and each delivers a foal. According to the opinion of some of our

best breeders the average farmer may raise one out of five for which he may expect to receive a better price than the Government agrees to pay. On this latter colt he will pay a fee of $25 and the remaining four may be sold to the War Department or otherwise exempted, thus making a total service fee of $25 for five three-year-old colts. Another advantage to the farmer is that a purchasing officer of the Army will visit the different localities in which the stallions have stood, for the purpose of buying these colts, and no doubt many horses sired by privately owned stallions will be bought at the same time. Hence a better opportunity is offered the small farmer to sell his colts direct at a fair price with the least possible effort on his part.

The following data on the cost of raising horses were secured by the statistical division of the Department of Agriculture by corresponding with hundreds of farmers and stock raisers in each State: In Virginia the average cost of raising colts to three years of age was shown to be $108.94. This total amount was made up of the following items: Service fee, $11.27; value of time lost by mare, $9.69; breaking, $2.21; veterinary fees, $1.55; incidental expenses, $3.53; feed, care, and shelter, $80.53. The average total cost for raising three-year-old colts in Kentucky was $103.06, and for the entire United States $104.05. Taking the figures giving the total average for the United States ($104.05), and deducting the service fee ($12.94) and the cost of breaking ($2.22), we have left $88.88, which should represent the average cost of raising colts on the remount plan where the Government donates the service fee and the colts are not required to be broken. It is also interesting to note that these data show the average value of three-year-olds in the United States to be $136.17.

As a further comparison of the price of horses, attention is invited to the fact that the War Department received bids in November, 1914, from contractors in Kentucky, Virginia, and Missouri, proposing to supply 500 horses at $145, $143, and $119 respectively. It is certain that each bidder expected to make a profit of from $5 to $15 per head in the event the contract was awarded him. Therefore, if we deduct the dealer's profit and expense from his proposed selling price we can make a close approximation of the price at which many farmers were willing to sell.

During the 1914 season the Government stallions were located in Virginia at Staunton, Flint Hill, Orange, Fredericksburg, Boyce, Gainesville, Bluemont, Front Royal, Harrisonburg, Savannah, Gloucester, Woodstock, Lexington, and Madison. If General Castleman will investigate these locations he will find the Department taking Government stallions into our poorer sections as an inducement to the farmer to get good mares and raise horses. The large number of mares served in these localities by Government stallions shows that the stallions are wanted. In fact, every owner with whom I have talked claimed that the stallion is a very unprofitable investment. It is therefore difficult to understand how the Government is competing with privately owned stallions and is "competing with a farmer and driving his mares from a producing field," by offering him a desirable stallion to which to breed his mares with a promise to either buy the foal or exempt him from paying a service fee.

General Castleman attempts to bring out the point that Germany, Austria-Hungary, France, and Belgium, which have Government-controlled horse breeding, would be able to produce only half as many horses as this country, which has no Government-controlled horse breeding, thereby implying that Government control is a handicap to horse production. As a matter of fact, the total area of the countries named is only about one-fifth that of the United States, consequently these same countries are producing many more horses per square mile than is this country. It seems to me that this is an argument for rather than against Government-controlled horse breeding.

From the character of the fighting in the present European war, where cavalry manœuvres have been of much importance, it is evident that the Government-controlled studs have been a great factor in securing high-class mounts. For Congress to appropriate money for the purpose of encouraging the production of horses for military use is to be recommended because it is a national phase in the proper horsing of our Army and at the same time encourages the farmer in the production of better horses, which is analogous to encouraging the growing of better crops of corn or wheat.—*The Breeder's Gazette.*

OPEN JOINTS.*

By J. N. FROST.
Ithaca, New York.

The literature in regard to suppurative arthritis seems to be a minus quantity so far as veterinary surgery is concerned, and the case reports are few. As one medical work states, "Our knowledge of joint disease is so imperfect that no opportunity should be lost by which clinical data may be added."

Causes.—The causes of open joints are kick wounds, nail punctures and the like, which not only open the joint capsule, but are liable to carry infection to the joint cavity, where synovia serves as a favourable medium for the development of the bacteria. Another cause, also, is the extension of necrosis from neighbouring areas of infection, such as tendon sheaths or bursæ. Likewise it may result by the process of metastasis from some distant suppurating foci.

The severity of articular wounds is not due to the lesions produced, but to the inoculation of the wound with bacteria. When pyogenic organisms gain entrance to a joint cavity they lead to inflammation of all the structures of the joint, followed by suppuration, and, unless overcome, to the destruction of the joint cartilage and the discharge of the same in the form of pus, leaving the ends of the bones bare and rough. Naturally, this leads, in those joints where the movement is limited, to anchylosis or stiffness of the joint.

Symptoms.—If the wound of the joint is small and made by a clean instrument, the only symptom may be the discharge of synovial fluid. In most cases there will be, however, some infection which results in signs of irritation, such as swelling of the joint, increased synovial fluid, or tenderness on palpation. If the infection is severe there will be œdema, fever as high as 104° to 105°, with pulse and respiration increased. The patient holds the swollen painful articulation in a position to relieve the pain as much as possible, touching only the toe to the floor. Frequent convulsive movements are made with the leg, indicating pain in the part. The tissues surrounding the joint are inflamed and swollen, and there is a discharge of synovia from the wound, which at first is a slippery, transparent straw-coloured liquid.

* Paper read at the Seventh Annual Conference, New York State Veterinary College.

Synovia may be recognized by its tenacity if the finger which touches the fluid is slowly withdrawn. This is a sure sign that the fluid has come from a synovial bursa, or in other words, that it contains mucin.

As inflammation of the joint advances the synovia is discharged in thick, heavy clots. After the synovial membrane becomes infected, its secretion is greatly augmented, and the discharge is a thick yellow mixture of pus and synovia, which is thrown off in large quantities.

The loss of flesh is exceedingly rapid, even though the appetite remains good. Due to long periods of decubitus, sore and infected areas develop on the skin over the external angle of the ilium, the shoulder, and the supra-orbital process of the head.

The differential diagnosis between a suppurative arthritis and suppurating tendon sheath is not always easy, as the discharge from each has the same general appearance and around most of the joints there are tendon sheaths which may become opened more readily than the joint. There is usually a difference in the degree of lameness. The animal with open tendon sheath does not ordinarily show as great pain upon movement or upon bearing weight on the part as does the animal with open joint.

By probing we can usually make our diagnosis positive. We are told by many that probing should not be resorted to, and this no doubt is true if it cannot be done in an aseptic manner. We fail to see, however, why there should be danger if we are careful to disinfect the wound and then use a thoroughly sterilized probe. After probing we are in a position to give a more accurate prognosis and treatment.

Treatment.—The treatment of suppurative arthritis is highly unsatisfactory, necessarily of long duration, and in a great percentage of cases is unsuccessful. The death-rate has resulted in the trial of a great number of drugs, including poultices, blisters, continual irrigation with weak antiseptic solutions, ointments of camphor, alum, calomel, and corrosive sublimate.

In the treatment of open joints they may be divided into two groups: —

(1) Open joints, such as the stifle, shoulder, elbow, &c., where anchylosis cannot occur, or, occurring, would destroy the usefulness of the animal.

(2) Open joints which, if anchylosed, will not seriously impair

the value of the animal, such as the smaller tarsal joints of the corono-pedal joint.

The first question to be decided when a joint is involved in acute suppuration is whether an attempt should be made to prevent anchylosis or whether the process should be favoured.

Taking the first group, which comprises the more important joints, and in which anchylosis would be disastrous to the usefulness of the animal, we find it impossible, or least impracticable, in the larger animals to bandage these parts. If the joint is not infected by the object causing the injury, it is almost certain to become infected by exposure. In treating these cases we must prevent too great an infection, which causes an inflammation and destruction of the capsule and cartilage, and thereby results in anchylosis. We must also be careful that our antiseptics are not so strong as to cause some irritation to the joint capsule and cartilage, producing an inflammation of the same as well as increasing the chance for infection, and in so doing hasten the destruction of the part.

It is a known fact that most of our antiseptics cause irritation to the tissues even in a strength which is too mild to harm bacteria. Our antiseptic then must be one that not only prevents the growth of bacteria, but also that does not produce irritation of the tissues.

We have found pure glycerine to be an agent which produces no visible irritation of the tissues, and we have also found that bacteria fail to multiply upon it. According to Rideal on "Disinfection and Preservation of Food," bacteria and insects are killed by undiluted glycerine, since, having a very low diffusive power, it causes death by desiccation. Spores with thicker envelopes resist it indefinitely, and on dilution of the glycerine begin to grow immediately. Cultures made in the laboratory of streptococcus and staphylococcus and mixed cultures from cases of fistulous withers fail to make any growth on glycerine. The injection, under aseptic conditions, of pure warmed glycerine into the hock or stifle joint of a horse causes the animal no distress, and is followed by no increased heat in the part, no pain upon pressure, and no change in the gait of the animal.

We find also that when we inject under aseptic conditions one part of Lugol's solution to four parts of glycerine, or in other words, 20 per cent. Lugol's solution in glycerine, it fails likewise to cause irritation.

In order to determine the amount of irritation produced by glycerine, we injected 2 oz., slightly warm, into the joint capsule of the hock of a horse. Twenty-two hours later the animal was killed. It had shown no signs of irritation, and the capsule of the joint failed to show any congestion. Another animal, treated in the same way, was killed forty-eight hours after injection, and failed to show any symptoms, and the joint capsule remained normal. Two other animals were injected in the stifle joint in the same manner. One was killed on the third day; the other, at the end of two weeks. Neither showed any ill-effects from the injection, and the joint capsules remained normal. In all, fourteen horses were injected, and none showed any signs of a disturbance in the joint.

Later, injections of 20 per cent. Lugol's solution in glycerine were made in the same manner, and the animals killed at intervals of four, eighteen, and forty-eight hours and three weeks. In all, we were unable to see that any irritation had been produced.

The treatment recommended by us for open joints, in which we wish to prevent anchylosis is, first, to shave all hair from the area surrounding the wound, following with a thorough cleansing of the skin and disinfection of the wound, and then to inject a 20 per cent. Lugol's solution in glycerine into the wound. This should be repeated two or three times a day, each time enough of the solution being injected to fill the joint capsule, thereby securing the flushing effect. As this solution does not cause any irritation to the tissue and yet is a strong antiseptic, it serves to shorten the period of congestion and inflammation and to overcome the infection without causing a destruction of the secreting membrane until the external wound has had time to heal. The injection of this solution seems to retard the excessive secretion of synovia. The larger the joint capsule and the smaller the external wound, the longer our antiseptic will remain in contact with the inflamed tissues as the glycerine, being thick, does not flow readily through a small opening.

In treating Group 2, those joints in which anchylosis does not impair materially the value of the animal, we believe the treatment should be much the same in the beginning as in Group 1. If we find the secreting membranes are highly infected and cartilages are becoming eroded anchylosis is bound to occur, and we should direct our treatment towards hastening the process.

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In this group we can use the bandage and antiseptic pack to good advantage, as all of these joints may be readily bandaged. The application of a 1 : 100 corrosive sublimate or other antiseptic pack should prevent further infection to the part. In making the pack, we have found it advisable to use gauze in place of cotton, as the gauze allows the secretion to pass through and thus drain away, while the cotton has a tendency to dam back the secretions and hold them in contact with the wound and prevent the flushing action produced by the secretion of synovia. The free discharge of synovia acts as a flushing agent, and thus carries out infection and pus from the joint cavity. The proper application of the pack and bandage constitutes the first principle in the treatment of inflammation, namely, rest to the part, by preventing or lessening the motion of the joint. Motion results in irritation to the tissues and promotes infection. We may render the joint immovable by the use of splints, shoes with a brace, or tar bandages and heavy packs. That this lessens the infection and pain greatly is shown by the unusual amount of weight which the animal will bear on the part.

By making a free opening into the joint, we may be able to curette away the joint cartilage and thus hasten the process of anchylosis. Then, too, by increasing the size of the opening into the joint, we have a better opportunity to disinfect thoroughly the joint cavity, overcome the infection, and thus prevent fatal sepsis. Abscesses in the periarticular tissue should be opened wherever they occur and their cavities thoroughly drained and disinfected.

For the purpose of disinfection we have found long narrow strips of gauze saturated in tincture of iodine to be of great benefit. The iodine also serves as more or less of an irritant, and causes a destruction of the secreting membranes and joint cartilage which must take place before we may hope for recovery.

In the human being and in the smaller animals there is another operation which may be resorted to—amputation. When the infected area is great and there is danger of death from septicæmia, the removal of the distal portion of the member allows of thorough disinfection of the joint, as well as the removal of the infected area which is producing the sepsis.

We do not favour the use of slings in disease of the articulations, believing that the animal, if worth treating, is able to get up and down readily if given a box stall with sufficient room. Certainly a horse, if given a proper amount of dry bedding to prevent decubitus gangrene, rests more comfortably in a large stall than it does in a stiff pair of slings. Another point, which is often ignored, is the removal of the shoes from a horse which is spending much of its time in a recumbent position. The bruising of the pectoral region from the front shoes, and the resulting infection may be sufficient to overcome the animal that is fighting to withstand the attack of septicæmia which is resulting from suppurative arthritis.—*American Journal of Veterinary Medicine.*

Clinical Articles.

A PECULIAR CASE.

By J. F. D. TUTT, M.R.C.V.S.
Winchester.

THE subject was a bay mare, 10 years old, sent into hospital owing to large "sores" on the off hind limb. These lesions are well shown in the accompanying photograph. The "sores" discharged a little saneous fluid, and showed no tendency to

increase in size or to diminish under treatment, nor did any more appear on the limb.

The mare was tested twice with mallein by the subcutaneous method, and in each case gave a temperature reaction, but no local reaction of any consequence.

Not being satisfied, the ophthalmic test was applied twice

at intervals, and each time a positive reaction was obtained—the eyes of "control" horses failed to give any reaction.

On this evidence it was decided to have the mare slaughtered.

Post-mortem Examination.—A careful examination of lungs, &c., failed to reveal any glanders lesions. The lungs were, however, in the condition known as anthracosis—were emphysematous—and there were old pleurisy lesions on the right lung.

Remarks.—The question that naturally arises is why a doubtful or negative reaction was obtained with mallein when given subcutaneously, and a positive reaction when given ophthalmically.

TOXIC ENTERITIS AND CONSTIPATION IN THE DOG.

By G. MAYALL, M.R.C.V.S.

In the following two cases I wish to mention a line of treatment which has hitherto not been frequently adopted in this country for the complaints named. I am indebted to the "Textbook of General Therapeutics," by Frölner (p. 134), for one half of the treatment, and to a paper by Marquet, on "The Internal Use of Liquid Paraffin," for the other half. This appeared on p. 44 of The Veterinary Journal for January, 1915.

On February 16 I was called to see a rough-haired fox-terrier dog that had been vomiting, and passing pultaceous blood-tinged fæces. I found my patient able to get about listlessly, with a temperature of 103° F., and with a mouth in a bad state from loose, tartar-infested, and decayed teeth. He was about 10 years old. I gave him a 3 gr. dose of calomel, and ordered him to be put on Brand's essence and barley and milk. On calling next day I found him lying disconsolately with a temperature of 104° F., and having passed a small quantity of semi-solid, blood-tinged fæces.

I injected him up the rectum with 3½ pints of warm water, to which common salt had been added in the proportion of about 1½ dr. to a pint of water. The injection was made with the dog's mouth tied up, his hind feet held up by an attendant and his fore feet resting on the ground. In less than five minutes vomition occurred containing greenish slime and particles of food. A second injection was followed by clear vomit. I now gave him a teaspoonful of liquid paraffin (better known to the

chemist as pure liquid petroleum), which was kept down. Next day he was weak and prostrate, but his temperature was down to 101° F., and his general condition seemed better. I gave him a second teaspoonful of paraffin. He had taken some Brand's essence and a little barley and milk on the morning of my visit and had retained them. Next day I was informed he had passed some soft fæces in the night and had taken more fluid nourishment. He got up and walked about while I was present and seemed considerably brighter. Eventually he made a good recovery, his bowels being regulated by occasional doses of paraffin, and care being taken to put him on semi-solid and solid food, chiefly of a farinaceous kind, gradually.

On March 4 a valuable Airedale dog of large size was brought to me with the history that he had been vomiting and had passed no fæces for four or five days.

I injected him with two quarts of salt and water until he vomited clear fluid. I then gave him a dessertspoonful of liquid paraffin, and next morning was pleased to see he had passed a fairly copious motion. He had been receiving laxative medicine previous to coming to me, but it had not had the desired effect. He has done well.

The salt-water injection treatment has been carried out at the Copenhagen Clinic and at the University of Pennsylvania for some years, and with very good results in all classes of dogs.

Those of us who know how frequently dogs suffer from toxic, hæmorrhagic, and catarrhal ailments of the intestine, and how often these prove fatal, notwithstanding the use of the latest medicaments, will be inclined, I feel sure, to try a new line of treatment and record results.

My experience, even if only scanty, has at any rate been gratifying. I think the two treatments by paraffin and copious salt-water injections are about the most rational yet put forward for intestinal complaints in dogs. It is always advisable to inject the dogs and watch them vomit before giving the paraffin. The reason for this will be obvious. We get a reasonably clean intestinal tube before administering medicine, and limit the dangers arising from toxin formation and auto-intoxication.

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DEVELOPMENT OF A CYST INTO AN ABSCESS IN THE ŒSOPHAGO-LARYNGEAL REGION.

By J. SCHANTYR.

In a four-year-old dog a hot, slightly painful and fluctuating swelling arose on the anterior and right side of the upper third of the neck, which extended from the intermaxillary space to the posterior wall of the larynx. The mucosa on the right side of the mouth was much inflamed and thickened. On pressure from below upwards on the swelling at the neck a long fluctuating elevation the size of a pigeon's egg gradually arose in the oral cavity on one side and to the right of the tongue, and then the external swelling became smaller. The body temperature was 102·8° F. After opening the swelling, which was diagnosed as an abscess, greyish-green pus was evacuated. Closer examination of the abscess cavity showed that it consisted of two parts. The wall of the hinder larger portion was uneven; the wall of the anterior, on the contrary, smooth and even. The latter was the size of a hen's egg, sharply defined, and situated on the lateral side of the head of the œsophagus and of the larynx. Both divisions communicated by an opening 1·5 cm. wide.

As cysts often occur in the neck region in the dog, Schantyr considers that the anterior abscess cavity with smooth walls was a purulent infected cyst, whose contents after opening had discharged into the subcutaneous tissue of the region.—*Record of Scientific and Practical Medicine.*

A SEVERE CASE OF ARTICULAR RHEUMATISM IN THE DOG.

By RÖHSLER and SSEREBRENNIKOW.

In a young dog 1 year and 9 months old, which was brought to the clinic on account of loss of appetite, there was diagnosed catarrhal inflammation of the nasal, pharyngeal and laryngeal mucosæ, increase of heart dulness, and quickening and arhythmia of the pulse. The gait was stretched. On the third day the animal went markedly lame, and the right carpus and elbow-joint were swollen, hot, susceptible to pressure, and movement painful. In the course of the next eight days the inflammation attacked the other joints in the following order: left elbow-joint, and both

shoulder-joints, then the right and left stifle and hip-joint. Movement was performed with difficulty and pain, finally the animal became continuously recumbent. Besides there were fæcal stasis and superficial breathing. On the first and last four days of the illness the temperature stood at 104° to 105° F. Treatment with sodium salicylate brought no improvement, and the greatly cachectic dog was killed.

Post-mortem showed: Increase and yellowish-red discoloration of the synovial fluid, with the presence of fibrin shreds in the joints affected. The region of the joints was permeated by small or large hæmorrhages and œdematously infiltrated catarrh of the gastro-intestinal canal, serous pericarditis, adhesion of the epicardium with the pericardium, dilation of the heart, marked attenuation of the cardiac walls, especially of the right ventricle, and slight thickening of the valves of the heart.—*Record of Scientific and Practical Medicine.*

A CASE OF PUTREFACTION *IN UTERO.*

By W. P. BOSSENBERGER, D.V.M.

On November 30 I was called about twelve miles to see a cow suffering from a strange case of dystokia. The animal, a large Holstein cow, was due to calf the latter part of the preceding August. The owner attended the state fair for a few days about this time, and on his return found the cow showing all signs of having delivered normally. The milk secretion was normal, the flanks and hips were sunken, and a portion of after-birth was hanging from vulva. A search for the calf was made, but failing to find it, the owner supposed that dogs had eaten it, and nothing further was thought of case; the cow appeared normal in every way.

November 30, while doing chores, the owner saw the cow in labour, and going to her assistance and attempting to use traction on fœtus caused the skin and flesh to be pulled from bones. Then I was called and found the head and one fore foot presented; the other front leg flexed at the knee. The genital organs of the cow were so firmly contracted upon fœtus that examination was difficult; only the flat hand could be passed

between uterus and fœtus. In attempting to straighten the fore limb it gave way at the knee.

After all was properly placed traction was applied, but to no benefit. Then the fœtus was well greased with lard and traction again applied; still the fœtus did not move more than an inch. A block and tackle was applied, and two men had to use all their power to effect a delivery by this means; however, after considerable twisting and turning of the fœtus and great traction the delivery was effected.

In passage almost all the hair and skin came off, so badly putrefied was the fœtus. The fœtal membranes and the cotyledons were all in a liquid state, and came away readily as soon as calf was extracted.

After delivery the cow immediately began eating hay, but I have not heard whether she lived. I was inclined to give a fatal prognosis due to the putrefying of the cotyledons, allowing absorption of fluids through the wounds thus caused. Of course, the womb was well irrigated, which may have assisted somewhat in preventing septicæmia.

I have never before seen or heard of a case like this, and would be glad to learn from the readers if anyone has seen a similar case.—*American Journal of Veterinary Medicine.*

A NEW VETERINARY SCHOOL IN ITALY.

THE project to establish a veterinary school at Padua has been well received by the University Senate, the Provincial Council, and the Agricultural Societies. In view of such an institution those interested have reminded the authorities that it would simply be the renewal of a tradition, which dates back to 1765, with the foundation of a Chair of Veterinary Medicine, which was suppressed when Padua fell under the Austrian domination. Even before that date, however, it would appear that the veterinary teaching at Padua was more apparent than real, according to our Paris contemporary, the *Revue Générale de Médecine Vétérinaire.*

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Translation.

THE WAR AND APHTHOUS FEVER. DR. ENRICO CONTI'S REMEDY.

ABSTRACTED BY I. S. C.

THE experiences and observations of the famous Italian veterinarian, Dr. Enrico Conti, are especially interesting at the present moment in view of the epidemic of aphthous fever, which is reported to be spreading among the cattle of the concentration camps around Paris.

The disease has not only invaded France, but it has also established itself in East Prussia. This misfortune for the enemy was noted by Schütz, in an address which he recently delivered in Berlin as one of a series of the so-called "War lectures."

The lecturer explained that the Russians had taken possession of the cattle in the territory which they at first occupied in East Prussia; but, being subsequently defeated by Von Hindenburg, they were forced to make restitution of their plunder.

The captured animals were returned, but in the meanwhile they had contracted aphthous fever. Thus the complaint is now epidemic in East Prussia as well as in North-western France.

The lecturer referred to the expenditure of 2,600,000 marks in 1912, the handsome sum which was paid in compensating owners for compulsory slaughtering of infected or suspected cattle. The most drastic measures were employed to ensure success in the strenuous effort then being made to stamp out aphthous fever in Germany: yet there it arrives again by the fortunes of war!

Indeed, it is by such side issues as disease among animals and troops—with or without scarcity of food—that military matters are frequently determined. Hitherto, however, a strict impartiality seems to have been observed as between the belligerents, at any rate in the equal distribution of animal disease. The fickle goddess of fortune just now is showing a neutrality quite Italian. Therefore, the discoveries of Italian veterinarians can be made use of by either side—or by both—for it is to the mutual advantage even of enemies to eliminate as far as may be the incalculable chances of widespread apthous infection from a warfare which is more terrible than enough already.

In *La Clinica Veterinaria* of January 15, Dr. Enrico Conti urges veterinary practitioners to fight malignant aphthous fever by adopting his plan of dealing with the scourge, because he has found it to be the most efficacious of all the measures that he has in turn adopted. At the same time he warns his colleagues against the least carelessness in the method of carrying out the operations which he recommends, because so much depends on the way his instructions are followed.

He says that every other sort of treatment had been tried with very little success in combating the unprecedented virulence

of the 1913 outbreak of malignant aphthous fever in Italy. Undoubtedly the best treatment proved to be that of intravenous injections of an isotonic solution of bichloride of quinine. Other kinds of intravenous injections had previously been tried unsuccessfully, including various preparations of silver (zimargol, protargol, &c.), which are supposed to be specific against infection in general and aphthous fever in particular, but the terrible mortality could not be checked. At one time it was as high as 80 per cent. in certain districts, and in the most favoured places it never sank below 30 per cent.

Such an epidemic had been previously unheard of within living memory, and naturally no stone was left unturned in fighting it. All possible remedies, both local and general, were tested with the double purpose of maintaining the function of swallowing among the victims and of destroying the teeming bacteria which necessarily characterize the disastrous malady itself, but which flourished inordinately at that particular period as a consequence of the dry fodder which is always inevitable during the winter season.

In the midst of his dishearteningly futile efforts Dr. Enrico Conti heard that the eminent Professor Domenico Bernadini, Director of the Surgical Clinic at the Veterinary School of Parma, had obtained good results during a former outbreak of aphthous fever by means of intravenous injections of quinine. Dr. Conti anxiously hastened to consult the professor with regard to these previous experiments, and, being greatly encouraged, he decided to adopt the treatment in question.

In the course of his own experiments with the quinine injections Dr. Conti found it necessary to modify the original method of procedure. This, though most clever and scientific, proved to be somewhat impracticable. It was, above all, important that the treatment should be brought within the resources of all ordinary practitioners, so a process had to be initiated which should be as simple as compatible with efficacy.

The method adopted by Conti is thus described by himself:—

"I used a scrupulously sterilized glass syringe holding 20 c.c. I disinfected the skin with iodine, having first shaved the animal's neck, round about the jugular vein, where it was to be penetrated.

"I inserted into the puncture a little tube, which, at the right moment, I entrusted to an assistant who knew how to draw it forward in a particular manner when I introduced the syringe and to let it go back when I had made the injection.

"I was always careful to allow a little blood to escape before introducing the solution.

"The amount of the injection varied from 20 to 60 c.c., according to the circumstances and age and sex of the patient. For instance, I injected 20 c.c. into heifers up to about 18 months old, and 30 c.c. into steers over 18 months, and 60 c.c. into bulls.

"As I always operated with proper precautions I never had to regret the least mishap, to say nothing of the more serious consequences which were generally prognosticated; among these

the alarmists anticipated phlebitis, thrombosis, and the introduction of air into the veins.

"Most certainly it is necessary to take care that the liquid should entirely pass into the jugular vein. If this is effected no local reaction will supervene. If, however, some drops should escape into the subcutaneous cellular tissue there will be some slight induration or ecchymosis—at the worst a temporary local disturbance of no consequence, which will give way to subsequent suitable treatment.

"I have observed that animals do not appear to suffer from any after-effects in consequence of these inoculations, excepting only in case of the injection being made a little too rapidly; then the patient might be affected with vertigo and might even fall, though without alarming symptoms or fatal consequences. Such accidents can be avoided by due care in pushing home the piston of the syringe with the utmost slowness."

Having given this warning Dr. Conti supplies a circumstantial list of his inoculations and their results. This shows the number of inoculated animals during three months to be 258 with twenty-nine deaths.

He considers that this average, of about 11 per cent., is sufficiently gratifying, considering the previous mortality in that disastrous epidemic, and remembering the fact that many of the patients were already gravely affected before they could be inoculated. He asserts that recovery was in direct relation to the time which elapsed between infection and inoculation.

Dr. Conti very modestly draws the attention of his colleagues to the results of his labours, which, as he says, prove the efficacy of the means he employed. In his opinion nothing better has been discovered up to the present. At least, the death-rate in malignant aphthous fever can be considerably diminished by the treatment advocated.

Not even this can be urged in favour of other measures which had first been tried; so, with all deference to the veterinary profession, the writer recommends that in all cases of malignant epizootic aphthous fever bichloride of quinine should be relied on, and should be administered in the manner and doses which he has found to be so efficacious.

It may be useful further to note the special prophylactic measures which were adopted in his own commune by the advice of Dr. Enrico Conti.

As a protection against infection from neighbouring communes, which were more than ever ravaged by the disastrous disease, sanitary cordons were instituted. These were served by ordinary citizens under the direct command of the communal guard.

These special constables, being furnished with distinguishing badges, had to patrol the roads of communication night and day, and before allowing anyone to pass into their own commune (of Busseto) had to oblige all newcomers to dip their boots into a vessel containing a creoline solution. Carriages and horses had to pass over a prepared tract of quicklime, in order to prevent

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as far as possible the importation of the aphthous virus, which is known to be so easily diffused.

No such measures can be absolutely infallible, but these precautions certainly helped during that unhappy period to keep the deplorable disease within certain definite limits where it could be treated. Thus therapy must always be allied with prophylaxis. All hygiene teaches us to lay to heart the maxim: "Prevention is better than cure."

Correspondence.

THE WAR AND THE PROFESSION.

The following letter has been received:——

My dear F——,—After seeing you the other day I returned in due course from my leave. I came over on the night of February 21, and the submarine scare was at its height and the crossing might almost be described as exciting.

Arriving at Folkestone at 8.30 p.m., I just had time to get aboard and off we went, leaving at 8.40. With all lights out we steamed into the night; the weather was perfect and the sea like a millpond—just the night for periscopes. The passengers were all officers, and a lot of us came from the same part of the line, so we stayed on deck and discussed the situation in preference to going below. One could see and be seen for a considerable distance, so everyone had the "periscope look." There was, of course, a fair amount of risk; but all the boats were swung out, so that even in the event of an attack there was not any great danger. Personally, I had already bathed and was not anxious for a cold bath. We were going along at a great "bat," and a torpedo would have had to be pretty slippery if it intended to catch us, so we eventually decided to demolish supper. In the saloon things were quite gay and lights burning bright, as all the portholes were below the water-line, so we did ourselves well. All of a sudden a bell rang and we saw the watertight doors at the end of the saloon slowly closing and conversation stopped dead. It quite gave one the falling of the tummy feeling, but we were all reassured when the steward informed us that they were only seeing that the mechanism was in order, as we were nearing an awkward spot. The searchlights from the battleships were sweeping round in lazy circles and the Calais light brightly burning well to our port. In a few minutes we steamed into Boulogne Harbour, not at all sorry that the crossing had been safely negotiated. I set foot on shore at 9.45, the quickest passage I have ever made across Channel. Luckily I found a car waiting for me, and I think there was more risk driving fifty miles through a land fog at 20 miles an hour than there was dodging submarines. However, I was snugly in my billet, five miles behind the firing-line, before 2 a.m., so had nothing to complain of; my less

fortunate friends who came by train not arriving until 7 a.m. the next day. The regiment left next day for the trenches, our people having to occupy a new trench a few yards behind the hole out of which the 16th Lancers were so unfortunately blown. The horses on this occasion did not go up, so that I was left in peace at our little "willage."

During the absence of the regiments the Army Veterinary Corps saw a good deal of each other, and we had quite a round of little dinners; but time hangs heavily, and we were all pleased to see our respective regiments return.

The casualties of the 11th were, fortunately, light; we had 1 officer badly hit and 4 slightly, 4 men killed and 14 slightly wounded. As usual, we are all awaiting orders for a move to any other climate than this.

As regards veterinary work, we are in the happy position of not being overworked with cases, as we find preventive precautions save a lot of sickness. In our brigade it is not usual to have more than about 35 animals under treatment out of the 600 odd in each regiment, and considering that all these cases could move off with the regiment, I consider this quite satisfactory.

The cases are various, comprising kicks and their accompanying wounds, cracked heels, frost-bites, picked up nails, laminitis, an occasional case of pneumonia, and, even less frequent, a case of colic.

The practice one sees is useful in that owing to the presence of a lot of knowledgeable farrier-sergeants, &c., one's diagnosis has to be quick, emphatic, and correct. I come across quite a number of Army Veterinary Corps men in my country jaunts, and I do not think there are many who will be sorry when this campaign is over.

A war is a great meeting-place and one meets friends from all parts of the world. I expect you are interested in the Singapore riot. I knew the 5th Punjabi Regiment well, and all of the officers who were killed. I do not attach any political significance to the outbreak, as it is a thing which could have happened in peace time. The general bearing of the men of this regiment never impressed me, and, although sorry to hear such bad news, I cannot say that I was at all surprised. However, I expect we shall both receive a full account of the happenings. Must now close.—Yours,

S. H. L. W.

THE FRENCH MILITARY VETERINARY SERVICE.

Two thousand French veterinary surgeons have actually been mobilized. No less than 1,000 are at the Front, and several have already fallen gloriously. Among these may be mentioned the following: —

Vétérinaire aide-major de 2e classe de réserve au 8e hussards, Dacier, killed on September 9, 1914.

Vétérinaire aide-major de 1re classe de réserve au 40e régiment d'artillerie, Devoge, wounded October 7, 1914, at the action of Croix-sur-Meuse, died on November 8, 1914, at the Military Hospital at Verdun.

Vétérinaire aide-major de 1re classe au Quartier-general du 14 corps, Vanney, killed in an automobile accident on military duty.

Vétérinaire-major de 2e classe au 6e régiment de chasseurs, Hans, killed on January 31, 1915.

Vétérinaire-major de 1re classe au 35e d'artillerie, Chaulet, shot.

Vétérinaire aide-major de réserve au 13e hussards, Berthélemé, killed on August 26, 1914, in Belgium, and buried by the Germans.

Several of our French colleagues are missing, and others are amongst the military prisoners taken by the Germans.

The following names have been specially mentioned in dispatches: —

M. Audit, Veterinary-Major of the Second Class, 3rd Regiment of Artillery, for having shown remarkable energy and coolness in the face of the enemy, and having saved a number of gun carriages from capture.

M. Ricquier, Veterinary-Major of the First Class, 4th Cuirassiers, for having shown remarkable determination and courage during an attack on a convoy, and for having assisted in the escape of the same.

M. Lambert, Principal Veterinary Officer of the Second class, for his admirable organization of the Horse Depôts.

Reviews.

Bibby's Book on Milk. Section II. The Law relating to the Sale of Milk: its History, Criticism of its Administration, and Suggestions for its Amendment. Published by J. Bibby and Sons, Ltd., Feeding Experts, Liverpool. 1914. Price 4s. net.

This book is full of information concerning the difficulties dairy farmers undergo in keeping up the standard quality of their milk. It has been produced largely through the efforts of Mr. John Hanley, F.I.C., F.C.S., the laboratory manager for Messrs. J. Bibby and Sons. The principal facts in connection with the analysis of milk sent by customers to the firm have been carefully tabulated.

There is a very complete record of milk cases in which a few of the law's decisions, and many of the magistrates' judgments on milk standard points are given. There is a distinction with a difference between the two classes of decisions. We are inclined to think that the dairyman and farmer would suffer less if his case could always be brought either before a stipendiary magistrate or one of His Majesty's judges. Dairymen and milk sellers would be subject to considerably fewer miscarriages of justice and faulty judgment if more farmers served on County Councils and other public bodies, and if agricultural matters were adjudicated on by men having a technical knowledge of the question under consideration. To a mere layman, however, it has always seemed an easy matter to administer the law on the subject as applied to the standard quality of milk if the two decrees thereon are read and interpreted literally. For the defendant to prove, by weight of acceptable evidence, that even if his milk is below standard, yet, nevertheless, *it is genuine* and just as obtained from the cow, ought to ensure his acquittal. The law, interpreted literally, is simple enough to understand; but a perusal of the history of the cases recorded in the book will show the reader what a fallacious view it is to assume that it will be so interpreted. The explanation a respectable milk seller has to offer for a lapse on the cow's part, and the calling of his attention to the analyst's report, unless the case is an absolutely fraudulent one, would appear to meet requirements, and perhaps do more good than haling every peasant, whose cow has failed in her supply standard, up in a court filled with the flotsam and jetsam of humanity.

The book contains copies of the Sale of Food and Drugs Act, the Dairies, Cowsheds and Milkshops Order and Regulations, Tuberculosis Order, and Board of Agriculture and Local Government Board Regulations concerning preservatives in milk and cream.

The volume is an interesting and instructive one. The philosopher with a broad mind could decide milk cases equitably if he

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took to heart the lessons to be learnt from a perusal of its pages. Those veterinary surgeons who wish to spread reliable information on the legal aspect of the milk question as its affects the cowkeeper and dairyman cannot do better than recommend this "Book on Milk" to their clients. G. M.

The International Institute of Agriculture: its Organization, its Work, and Results. Published at the Printing Office of the Institute in Rome. 1914.

At a time like the present we are apt to forget that "Peace hath her victories no less than War." "The existence of the International Institute of Agriculture is a fact really unique in the history of the world. The object of the work of the Institute is to defend and promote the agricultural interests of the entire world." Forty Governments and fifteen States and Colonies have given their adherence to the principles and objects of the Treaty as formulated at an International Conference held in Rome on May 28, 1905. The objects of the body as defined in Article 9 of a Treaty that has been drawn up are, shortly, to collect, study, and publish information concerning farming, vegetable and animal products, and markets, indicate the wages paid for farm work, make known the new diseases of vegetables and the remedies, study questions concerning agricultural co-operation, and submit to the approval of the Governments concerned measures for the protection of the common interests of farmers.

The General Assembly has met four times. The library of the Institute contains 33,000 volumes and 28,000 pamphlets.

One of the most important subjects at present being studied is land reform and the formation and maintenance of homesteads. The movement owed its inauguration to H.M. Victor Emmanuel III and to Mr. David Lubin, a citizen of the United States.

The publication is printed in the English language, and is well worth perusal by all those who appreciate the value of organization and co-operation in what should be the premier industry of every country.

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